

Work Order ID 68549

Friday, April 15, 2011 11:27:36 AM



Page 1

Item ID: D350-748-201

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Installation, High Aft

Start Date: 4/18/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 5/5/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: *mf*

Date: *11-04-15*

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D350-748-241	F								

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile & type labels per PPPD350-748-201

CHG002

Sulco/25

110

0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D350-748-241 using CNC bender program D350A and Folio FT

DP

11-8-30

120

QC15- Crosstube Dimensional Check

0.00



QC

Memo

0.00

Quality Control

Sulco/31

W/O: 68549		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D350-748-201 PAR #: N/A Fault Category: X-tube NCR: Yes No DQA: ✓ Date: 11.10.28
1-933 Resolution: use as-is Disposition: use as-is QA: N/C Closed: ✓ Date: 11/10/31

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
11.08.30	110	Tube bent too high. Re: Process	CP 11.08.31 PS1042	Cut cuff to 31.65" high. Re-measure. → Acceptable	TW 11-08-31	 11-8-31	CP 11.08.31 PS1042	S 11.08.31

NOTE: Date & initial all entries

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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

125

0.00



HandFXtube

Memo

0.00

SAD 11-03-20

Hand Finishing Crosstubes

Stress relief

Heat treat crosstube as per QSI010 4.3

Temp: 375

Start time: 4:30

Finish time: 8:30

127

0.00



QC

QC5- Inspect part completeness to step on W/O

Memo

0.00

Quality Control

S. v. 6/3/1

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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Required Date: 5/5/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

130



Crosstubes

Crosstubes

Crosstubes

Memo

0.00

1-Drill Tube as per Dwg D350-748-241 Using DT8876 Drill Jigs,
Set-up drill table as per QSI 010

2-Deburr

3-Engrave Part # and Batch # as per Dwg D350-748-241

4-Remove all marks from tube within limits of D350-748-241

5- Apply a light coat of LPS3 on the interior of tube

Batch: M109956

SAD

11-09-07

140



QC

Quality Control

QC6- Inspect dimensions to drawing

0.00

Memo

0.00

S. ulaloz

SAD
11-09-07

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Cust Item ID:

Required Date: 5/5/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150 	Outsource process-Cadplate per QSI017 4.1.9.1	0.00							
Outsource3	Memo	0.00							
Outsource process - Cad plate	Issue P/O: <u>14834</u> Stress relief at 375° for 5 hours Magnetic Particle Inspect per ASTM E1444 Cadium Plate per AMS-QQ-P-416B, Class 1, Type 2 Embrittle relief at 375° for 8 hours, Chromate Treat Possible Supplier: Southwest United Industries Ensure Certificate of Conformity is attached								<u>CH 11/09/06</u> ①
160 	Receive & Inspect for Damage & Mat'l Certs	0.00							
Packaging	Memo	0.00							
Packaging	Ensure certificate of conformity is attached								<u>Rec'd 10/11</u> ① <u>Rec'd 10/14</u> ②
170 	QC5- Inspect part completeness to step on W/O	0.00							
QC	Memo	0.00							
Quality Control									<u>11 10 17</u> ① PTO

★ SEE W/O CHG ATTACHED

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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NOTE: Date & initial all entries

W/O: 68549

WORK ORDER CHANGES

DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
11.10.13	161	LOAD TUBE TO 3000 ^{lb} FOR 1 MINUTE REF D.S. EMAIL	GP	11.10.14	1	GP 11.10.14 AS/042	S 11.10.16
11.10.13	162	NOT TUBE PO 15157	H	11-10-14	1	W	S 11.10.16

Part No: D350-748-201 PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Chris Provencal

From: David Shepherd <dshepherd@dartaero.com>
Sent: Tuesday, April 27, 2010 3:40 PM
To: 'Mike Petsche'
Cc: 'Bill Beckett'; 'L Lacelle'; 'Chris Provencal'; 'Dan Stow'; ssheldon@dartaero.com
Subject: 350 crosstubes

Mike,

I discussed the 350 crosstube load testing with Bill a little while ago and this plan makes sense to him.

So, my recommendation to clear these crosstubes is to load the fwd crosstubes to 3500 lb and the aft crosstubes to 3000 lb in the deflection test rig and document on the work orders that this test has been completed. Hold max load for 1 minute. Per TP-D350-748-2, these loads represent the maximum load on these crosstubes at gross weight and are below the yield point of the material. I would like to request that Chris Provencal witness these tests and sign off the work orders based on his experience with Dart landing gears. My feeling is that if there is a problem with the parts, it will manifest itself during this load test. I, for one, would feel a lot more confident in testing each crosstube in this manner than relying totally on what Exova has to say. I think it would be very difficult to reach a conclusion on the whole batch on the basis of cracks in two parts from the batch.

I believe that we can accomplish this before next Friday, which also gives us time to hear what Exova has to say in case it has an impact on our decision. So far, what I have seen from Exova shows me that there are fluctuations in the heat treating but the tubes are heat treated to our specification.

For this reason, I believe we should tell DHS that it looks like we will be able to start shipping 350 crosstubes by May 7th pending a successful Engineering test of the material.

David.

Work Order ID 68549

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Start Date: 4/18/2011 Start Qty: 1.00

Required Date: 5/5/2011 Req'd Qty: 1.00

Cust Item ID:

Customer:




Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180  SprayPaint	SprayPaint	0.00							
	Memo	0.00							
	1-Prime inside crosstube as per QSI 005 4.2 2-Paint Outside of Tube as per Dart QSI 005 4.2								
190  QC	QC14- Inspect Spray Paint	0.00							
	Memo	0.00							
	Then, Wrap in plastic bag to protect from scratches								
200  Crosstubes	Crosstubes	0.00							
	Memo	0.00							
	1-Install Ground wire Insert, then insert screw and washer 2-Install Abrasion strips as per Dwg D350-748-241 & QSI 035. 3-Install supports Using Dt8876 as per Dwg D350-748-241, Torque to 60-80 IN-LBS								

8 11 - 10 - 19

11 - 10 - 20 (1)

11 - 10 - 20 (1)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Cust Item ID:

Required Date: 5/5/2011 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

210

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

8/10/21

Quality Control

220

Pick Kit

0.00



Packaging

Memo

0.00

11/10/21

Packaging

230

QC4- 100% Inspect kits for completeness

0.00



QC

Memo

0.00

8/10/21

C

Quality Control

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Item Name: Crosstube Installation, High Aft

Start Date: 4/18/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 5/5/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
240	Packaging	0.00							
	Packaging								
Packaging	Memo	0.00							
	Identify and pack for shipping as per PPPD350-748-201								
	Location: _____								
	PPP Rev: <u>B</u>								
250	QC21- Final Inspection - Work Order Release	0.00							
	QC								
Quality Control	Memo	0.00							

SP 11-10-25

11/10/26

CMF 11-10-24

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

Picklist Print

Friday, April 15, 2011 11:27:33 AM

Page 1

Work Order ID: 68549



Parent Item: D350-748-201



Parent Item Name: Crosstube Installation, High Aft

Start Date: 4/18/2011

Required Date: 5/5/2011

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev: A New Issue 06-07-05 JLM
IPP Rev: B Update qty of MS21042L5 06-09-12 KJ
IPP Rev C Combined manufacturing 08.04.02 EC verified by: DD
IPP Rev:D 08-06-24 revD as per dwg DD verified by:EC
IPP Rev: E 08.12.11 Step17 was step 21 KJ Verified by:EC IPP Rev:F
10.08.04 added QSI010 4.3 DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
ALS4-1032-225		Purchased	No			200	Each	1,113.000	1	1			
Insert													

B# 118696

Location	Loc Qty	Loc Code
FP-B	40	
110768	40	
ST282	1073	
110768	1073	

AN4-41A

Purchased No

220

Each

198.0000

8

Bolt



Location	Loc Qty	Loc Code
ST360	198	
115108	98	
115705	50	
116191	50	

8 11/10/2011

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Page 2

Friday, April 15, 2011 11:27:33 AM

Work Order ID: 68549

Parent Item: D350-748-201

Parent Item Name: Crosstube Installation, High Aft

Start Date: 4/18/2011

Required Date: 5/5/2011

Start Qty: 1.00

Required Qty: 1.00

AN4-6A

Purchased

No

220

Each

1,071.000

16

16



Bolt



M118628 J

Location

Loc Qty

Loc Code

ST356

1071

115936

200

116191

71

116400

400

116924

400

AN5-32A

Purchased

No

220

Each

137.0000

4

4



Bolt



M117872 J

Location

Loc Qty

Loc Code

ST340

137

115108

27

115589

60

117161

50

AN960JD10

NAS1149D0363J Purchased

No

200

Each

0.0000

1

1



Washer

B# 118612



M111020

AN960JD416

NAS1149D0463J Purchased

No

220

Each

0.0000

32

32



Washer



M118612 J

AN960JD516

NAS1149D0563J Purchased

No

220

Each

0.0000

8

8



Washer



M118206 11/10/24 J

Friday, April 15, 2011 11:27:33 AM

Shop Packet Print

Page 2

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

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Parent Item Name: Crosstube Installation, High Aft

Start Date: 4/18/2011

Required Date: 5/5/2011

Start Qty: 1.00

Required Qty: 1.00

D2856-400

Manufactured No

200 f

231.0696

1.181

1.243158



Abraison Strip

B# 71164

Location

Loc Qty

Loc Code

ST403	216	
68076	216	
ST409	15.0696	
63735	15.0696	

1- cut as per dwg D2856

D3500-1

Manufactured No

220 Each

44.0000

4

4



Saddle

Location

Loc Qty

Loc Code

ST424	9	
66127	9	
ST424/25	20	
62207	20	
ST425	15	
61838	15	

D3501-1

Manufactured No

220 Each

67.0000

16

16



Bushing

Location

Loc Qty

Loc Code

ST063	67	
61984	67	

B67757 B68939 9x 5/11/12

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Start Date: 4/18/2011

Required Date: 5/5/2011

Start Qty: 1.00

Required Qty: 1.00

D3502-1
Support
Manufactured No

200 Each

31.0000

2 2

Location	Loc Qty	Loc Code
ST063	31	
61206	12	
61843	9	
64004	10	

D350-748-241TRN
Crosstube Turning Detail
Manufactured No

110 Each

2.0000

1 1

Location	Loc Qty	Loc Code
LG046	2	
64476	1	
64890	1	

MS21042L4
Nut
Purchased No

220 Each

2,582.000

24 24

Location	Loc Qty	Loc Code
ST300	2582	
116188	582	
116823	2000	

MS21042L5
Nut
Purchased No

220 Each

761.0000

4 4

Location	Loc Qty	Loc Code
ST300	761	
115594	1	
116105	500	
116548	260	

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Parent Item Name: Crosstube Installation, High Aft

Start Date: 4/18/2011

Required Date: 5/5/2011

Start Qty: 1.00

Required Qty: 1.00

MS21920-20

Purchased

No

200

Each

72.0000

2

2



Clamp (per MIL-DTL-8783C)



11-10-20

BS# 118649

Location

Loc Qty

Loc Code

LG050

72

116799

22

117279

50

MS27039-1-10

Purchased

No

200

Each

67.0000

1

1



Screw



11-10-20

BS# 118612

Location

Loc Qty

Loc Code

ST291

67

115935

67

Friday, April 15, 2011 11:27:34 AM

Shop Packet Print

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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

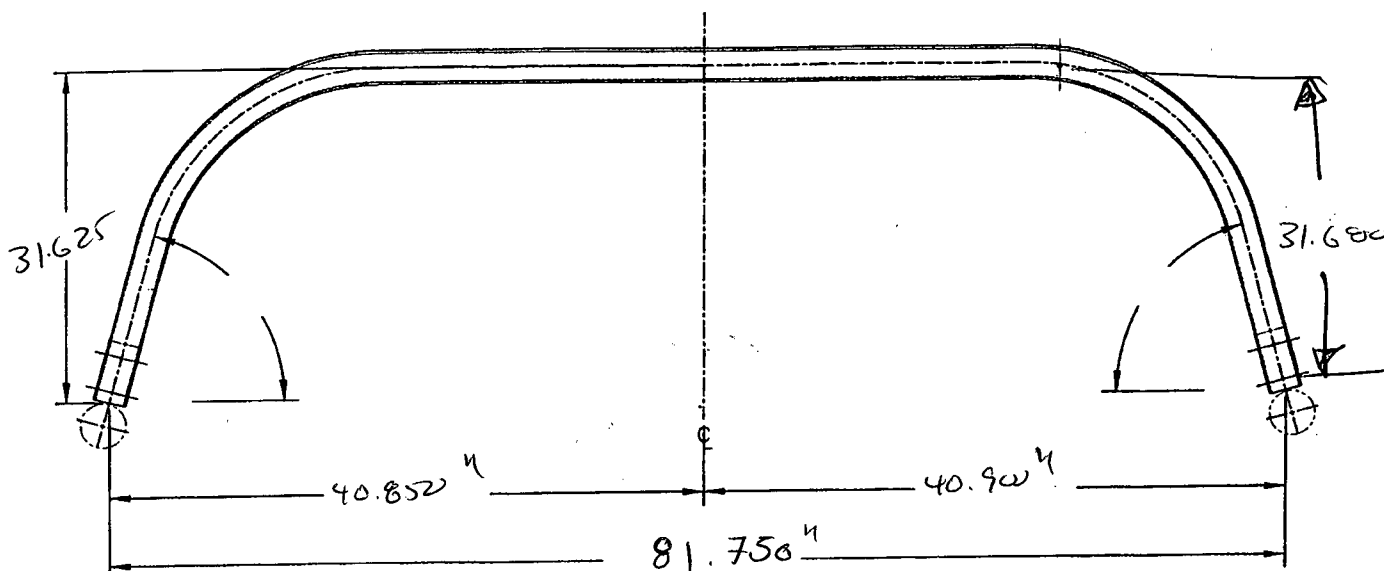
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	
Description: Crosstube High Aft (AS350/355)		Part Number:	D350-748-201
Inspection Dwg: D350-748-241 Rev: E		Page 1 of 1	

Required Dimension	Min	Max
Height	31.22	31.48
1/2 Span	40.77	41.03
Angle	75	77
Total Span	81.54	82.06



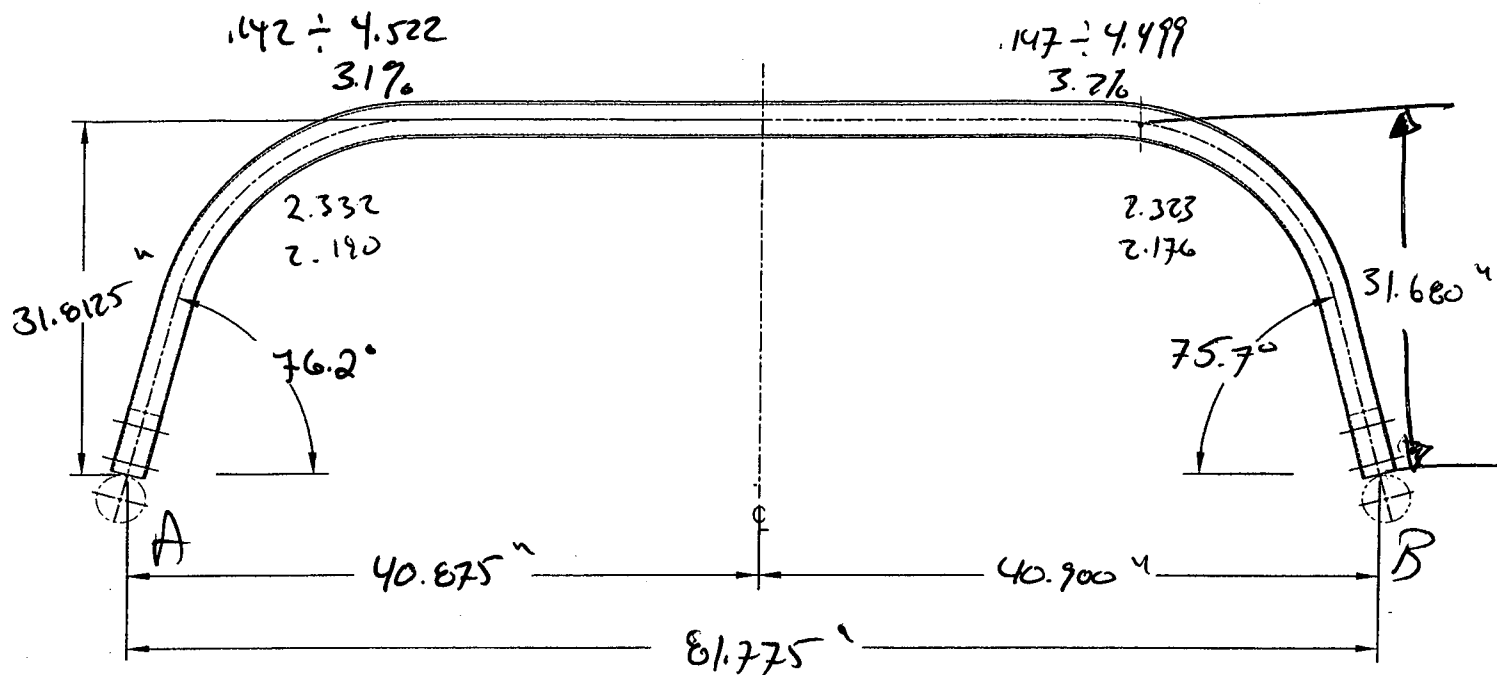
Comments
twist = 0.019
Acceptable 9/11/08.31 087.642

QC15 Inspection	S
Date	11/02/31

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	

DART AEROSPACE LTD		Work Order:	68549
Description: Crosstube High Aft (AS350/355)		Part Number:	D350-748-201
Inspection Dwg: D350-748-241 Rev: E		Page 1 of 1	

Required Dimension	Min	Max
Height	31.22	31.48
1/2 Span	40.77	41.03
Angle	75	77
Total Span	81.54	82.06



Comments	
twist = 0.004"	
Side A = 3.1%	cracking @ 17 passes
Side B = 3.2%	cracking @ 19 passes

QC15 Inspection	<i>S</i>
Date	6/26/31

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	

Item	Qty -241	Part Number	Description
1	X	D350-748-241	CROSSTUBE ASSEMBLY (AS 350/355 HI AFT)
2	1	D6015-125	CROSSTUBE (OR D6018-125)
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6015-125 OR D6018-125
FINISHED LENGTH = 122.700±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
- 6) IDENTIFICATION: DART PART NUMBER "D350-748-241" AND BATCH NUMBER ON INSIDE OF CUFF
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 29.85 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) RUN CUTTER OFF PART WHERE INDICATED. BLEND OUT ALL EDGES FROM MACHINING
LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER
BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO
BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING. ACCEPTABLE TO
VERIFY TENSILE STRENGTH BY HARDNESS TEST PER ASTM E18 TO 40-45 HRC.
- 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE,
CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES,
NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY.
CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE
MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO
CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT
NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 15) MAX TWIST AFTER BENDING: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN
CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.25 (ZN C1-3).

RELEASED
R 2011-07-08

F	ADD HRC TEST OPTION (B8-1) PER PAR 09-040, ADD TWIST LIMIT (A8-1, C1-3), ADD D6015-125 OPTION (C8-1), STOCK DIM NOW MACHINED (D1-4)	CP	10.11.23
E	REVISE GENERAL NOTES; UPDATE TO CURRENT STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A8-3); ADD TOLERANCES (ZN C6-3, D2-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6018-125 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	10.11.23		

DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWING NO. D350-748-241	REV. F SHEET 1 OF 4
TITLE CROSSTUBE (AS 350/355 HI AFT)	SCALE NTS
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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

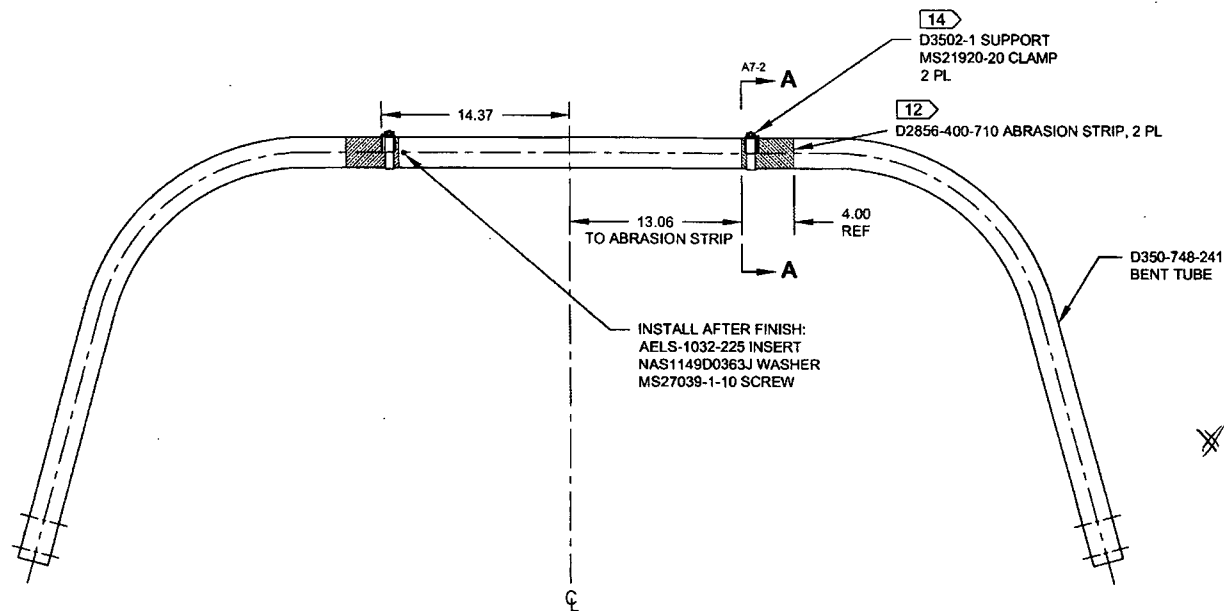
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D

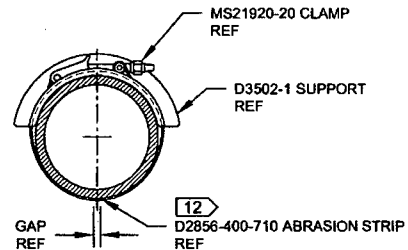
C

B

A



**D350-748-241
ASSEMBLY DETAIL**



SECTION A-A D4-2
SCALE 4X

RELEASED
2011-01-19

DESIGN	9P	DART AEROSPACE LTD	
DRAWN	9P	HAWKESBURY, ONTARIO, CANADA	
CHECKED	13	DRAWING NO.	REV. F
MFG. APPR.	13	D350-748-241	SHEET 2 OF 4
APPROVED	13	TITLE	SCALE
DE APPR.	13	CROSSTUBE (AS 350/355 HI AFT)	NTS
DATE	10.11.23	<small>COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

8 7 6 5 4 3 2 1

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

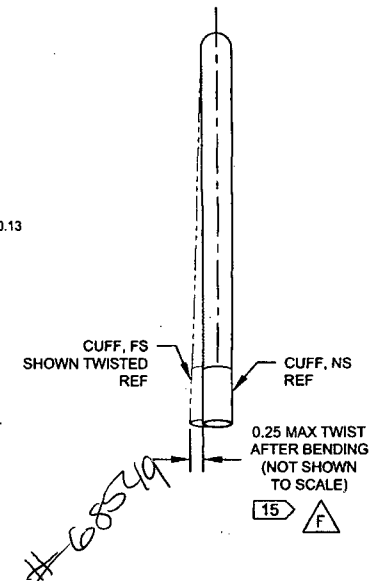
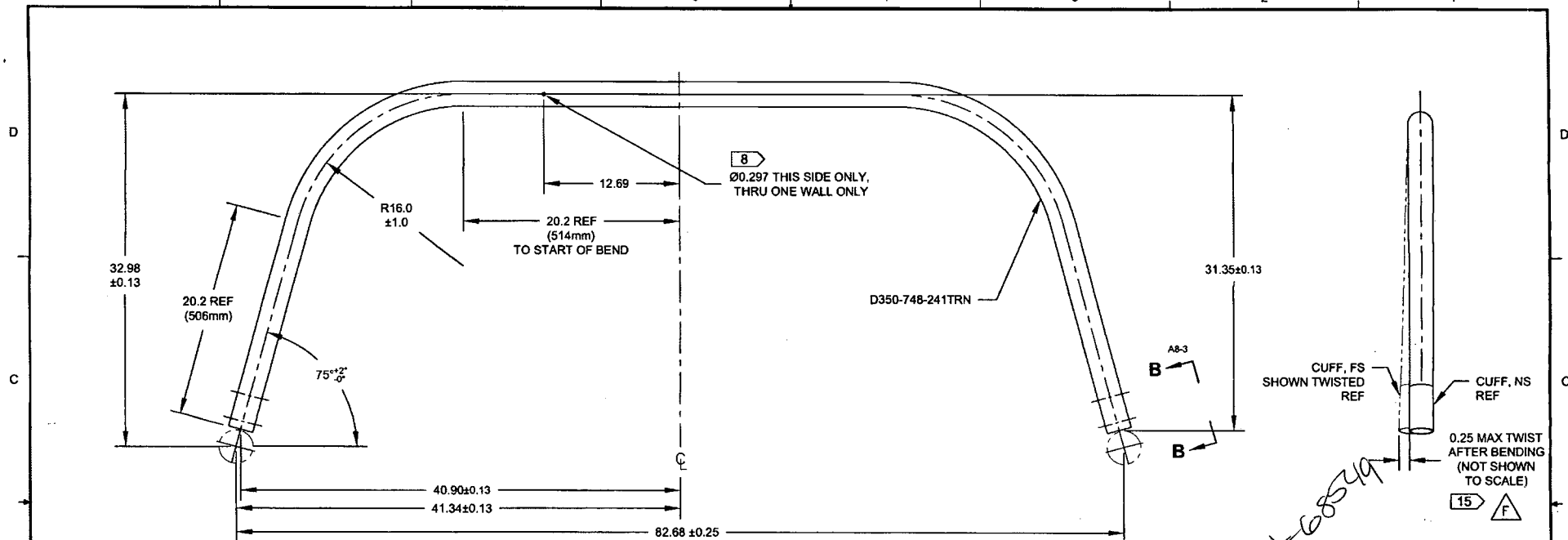
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

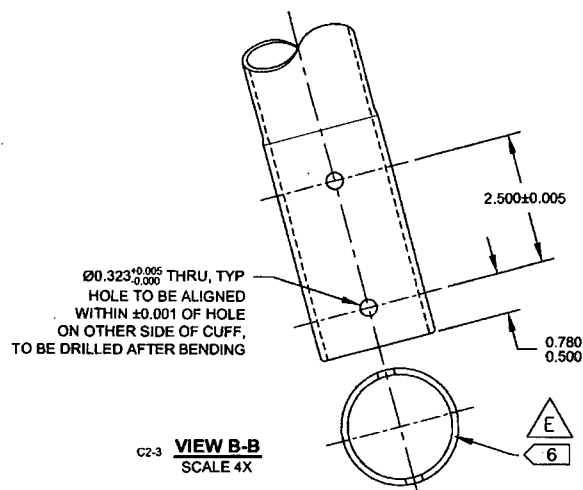
NOTE: Date & initial all entries

8 7 6 5 4 3 2 1



D350-748-241
BENDING AND DRILLING DETAIL 10

RELEASED
2011-01-18



C2-3 **VIEW B-B**
SCALE 4X

DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. F
MFG. APPR.		D350-748-241	SHEET 3 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (AS 350/355 HI AFT)	NTS
DATE	10.11.23	<small>COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD</small>	

8 7 6 5 4 3 2 1

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

**CERTIFICATE OF
CONFORMANCE**

**CADORATH PLATING CO. LTD.
2150 LOGAN AVENUE
WINNIPEG, MANITOBA R2J-0J1**

DATE: Sep-30-2011

CONSIGNEE TO: Dart Aerospace Ltd.
1270 Aberdeen St.
Hawksbury, ON K6A 1K7

W/O #: 107798
INVOICE #: 56968

**CONTRACT OR
PURCHASE ORDER #** 14834

DESCRIPTION:	SKID	QTY	1
P/N #	D350-748-201	S/N #	B68549

STRESS RELIEF BAKE HEAT CHART # 11-1001. MPI IAW ASTM -E-1444. CADMIUM PLATE IAW AMS-QQ-P-416 C TYPE 2 YELLOW CLASS 1. BAKE HEAT CHART # 11-1027.

CERTIFICATE: I certify that the items indicated here on have been inspected and tested and conform to all specifications and requirements detailed on the contract or purchase order.

Approved Inspector:



A large, stylized handwritten signature in black ink, written over a horizontal line.



LIQUID PENETRANT TEST REPORT

P- 05635

CLIENT DART AEROSPACE DATE OCT-14-2011 PAGE 1 OF 1
ATTENTION LINDA / CHANTALE / IAN / MATT ACUREN JOB NO. 114834
ADDRESS 1070 ABERDEEN ST. POWO No. 114834
HAWKESBURY ON WORK LOCATION
PROJECT PT-D WET FLUORESCENT LIQUID PENETRANT ON "CROSSTUBES" ACCEPTANCE STD. REV./DATE
ITEM(S) EXAMINED - SEE BELOW

JOB DESCRIPTION PROCEDURE NO. LT 002 REV./DATE 2007 TECHNIQUE No. LT 002 REV./DATE 2007
PART No. MATERIAL STEEL THICKNESS N/A
SCOPE PERFORMED A WET FLUORESCENT LIQUID PENETRANT INSPECTION ON 100% OF THE EXTERNAL SURFACE ON THE ITEMS MENTIONED BELOW

TEST DETAILS

METHOD ☒ FLUORESCENT ☐ VISIBLE ☐ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED
FAMILY BRAND MAGNA FLUX BLACK LIGHT S/N 13798 ☒ OUTPUT > 1000 μ W/CM² ☐ AMBIENT < 2 fc
PENETRANT 2L-67 MINIMUM DWELL TIME 10 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER 420 MINIMUM DRY TIME > 10 MIN. OTHER
DEVELOPER SKD-32 MINIMUM DWELL TIME 10 MIN. LIGHT METER S/N CAL DUE DATE Aug/2012
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY

TEST SURFACE

SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☐ MACHINED ☐ SHOT-BLASTED ☒ CLEAN BARE METAL
SURFACE TEMPERATURE ☐ < - 4°C/ 20°F ☐ - 4°C/ 20°F TO 10°C/50°F ☒ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F

RESULTS- (☐ METRIC ☐ IMPERIAL)

1 CROSS TUBE W.O. ID 68549 ✓
2 68550 ✓
3 68551 ✓
4 68553 ✓
5 72004 ✓
6 72005 ✓
7 73364 ✓

ITEM ID D350-748-201 HIGH AFT
D350-748-201 HIGH AFT
D350-748-201 HIGH AFT
D350-748-201 HIGH AFT
D350-748-201 HIGH AFT
D350-748-201 HIGH AFT
D350-748-201 HIGH AFT

NO RELEVANT INDICATION WAS DETECTED
AS PER APPLICABLE STANDARDS.

Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE Ian Titley DTR # E44768
TECHNICIAN (SIGNATURE): [Signature] SIGNATURE
NAME (PRINT): IVES DESROSIERS REPORT REVIEWED BY:
1ST TECHNICIAN 2ND TECHNICIAN
CGSB LEVEL 2 SNT LEVEL 3049 CGSB LEVEL 1 SNT LEVEL 1
CGSB REG. NO. 3049 CGSB REG. NO. 1